## AMENDMENTS TO THE CLAIMS

The listing of claims will replace all prior versions, and listings, of claims in the application.

As shown below, please cancel original claims 1-29 without prejudice, and add new claims 45-65 listed below.

**Listing of Claims:**

1. (Canceled)
2. (Canceled)
3. (Canceled)
4. (Canceled)
5. (Canceled)
6. (Canceled)
7. (Canceled)
8. (Canceled)
9. (Canceled)
10. (Canceled)
11. (Canceled)
12. (Canceled)
13. (Canceled)
14. (Canceled)
15. (Canceled)
16. (Canceled)
17. (Canceled)
18. (Canceled)
19. (Canceled)
20. (Canceled)
21. (Canceled)
22. (Canceled)
23. (Canceled)

24. (Canceled)
25. (Canceled)
26. (Canceled)
27. (Canceled)
28. (Canceled)
29. (Canceled)

30. (New) A scanning probe microscope comprising:

a base frame, to which a probe holder with a probe as well as a sample mount are attached or can be attached, in which case the probe and the sample mount can be moved relative to one another in order to obtain information about the surface of the sample by scanning a sample which is arranged on the sample mount;

wherein a reaction chamber can be attached to the base frame of (New) The scanning probe microscope, with the sample mount arranged in it, with the reaction chamber having an opening on its side facing the probe, through which the probe can enter the reaction chamber;

whereby the probe is moveable in a direction perpendicular to the investigation plane (xy plane) through a defined movement distance between a measurement position $P_M$ inside the reaction chamber and a withdrawn sample preparation position $P_V$ outside the reaction chamber;

whereby a closure device, in particular a cover or a cover plate, is provided in order to make it possible to close the opening of the reaction chamber after the probe has been moved from a measurement position $P_M$ to a withdrawn sample preparation position $P_V$; and

whereby the reaction chamber is adapted to enable a treatment of the surface of the sample within the reaction chamber when the reaction chamber is closed, particularly a treatment by the specific influence of fluids such as liquids, gases, particle flows and/or of a plasma and/or of electromagnetic, electrical and/or magnetic fields over a predetermined reaction time.

31. (New) The scanning probe microscope as claimed in claim 30, wherein the movement distance of the probe relative to the sample is between 1 mm and 15 mm, preferably between 1 mm and 6 mm, and in particular between 1 mm and 3 mm.

32. (New) The scanning probe microscope as claimed in claim 30, wherein the movement distance of the probe relative to the sample is between 1 mm and 3 mm, and is produced by means of an actuator, in particular a piezoelectric actuator, a piezo flexure positioning apparatus or a magnetic xy scanner or positioning apparatus, which is advantageously arranged between a micropositioning device, which is arranged on the base frame and a scanning unit which is connected to the probe holder.

33. (New) The scanning probe microscope as claimed in claim 30, wherein the reaction chamber also has an inlet, in order to introduce fluid media, such as liquids, gases, particle flows and/or a plasma into the reaction chamber, and particularly has an outlet, which is operatively connected to a suction device in order to pass liquids, gases, particle flows and/or plasmas via the inlet through the reaction chamber.

34. (New) The scanning probe microscope as claimed in claim 30, wherein a plasma generation device, in particular designed to produce plasma by inductive means, is arranged on or in the reaction chamber in order to allow a plasma to be produced within the reaction chamber.

35. (New) The scanning probe microscope as claimed in claim 34, wherein:

the plasma generation device has a flat coil, in which all of the windings are arranged essentially on one plane, and a capacitor, which is formed radially symmetrically or in a planar form; and/or

the plasma generation device preferably is in the form of a miniaturized, integrated radiofrequency circuit and, in particular, is in a planar form; and/or

the plasma generation device is operatively connected to a plasma monitoring system, with whose aid the power required to ignite and/or to operate the plasma generation device is controlled.

36. (New) The scanning probe microscope as claimed in claim 30, wherein at least two electrodes of opposite polarity are provided on the reaction chamber, in order to input energy capacitively.

37. (New) The scanning probe microscope as claimed in claim 30, wherein the reaction chamber has a volume of between 1 $cm^3$ and 10 $cm^3$, preferably of between 2 $cm^3$ and 5 $cm^3$, or the reaction chamber has a volume of 10$cm^3$ to 300 $cm^3$, in particular for the treatment of relatively large samples with an area of, for example, 40 mm x 40 mm.

38. (New) The scanning probe microscope as claimed in claim 30, wherein a conductor is or can be passed into the reaction chamber in order to make contact with the sample.

39. (New) The scanning probe microscope as claimed in claim 30, wherein the closure device has an actuator which is driven hydraulically, pneumatically, or mechanically, and results in low friction movements of the cover plate, avoiding oscillations, and preferably results in movement of the cover plate, in particular in a rotational or translational movement.

40. (New) A reaction chamber module for installation in a scanning probe microscope having the features as claimed in claim 30.

41. (New) The reaction chamber module as claimed in claim 40, wherein the reaction chamber module essentially comprises the reaction chamber itself.

42. (New) The reaction chamber module as claimed in claim 40, wherein the reaction chamber module comprises a reaction chamber base body as well as a reaction chamber.

43. (New) The reaction chamber module as claimed in claim 42, wherein the reaction chamber module can be inserted into a measuring table, which can be moved in the investigation plane (xy plane), or forms an integral unit with the measurement table, in particular as an interchangeable module for a chuck.

44. (New) A method for treatment and investigation of surfaces with the aid of a probe of a scanning probe microscope and of a reaction chamber which is installed in (New) The scanning probe microscope, comprising the following steps:

a first scanning probe microscopic investigation of an area of a surface of a sample which is arranged in an open reaction chamber is carried out;

the probe is withdrawn in a direction perpendicular to the investigation plane (xy plane), through a defined movement distance S from its measurement position $P_M$ to a sample preparation position $P_V$;

the reaction chamber is closed;

after closing the reaction chamber the surface within the reaction chamber is treated by the specific influence of fluids such as liquids, gases, particle flows and/or of a plasma and/or of electromagnetic, electrical and/or magnetic fields over a predetermined reaction time;

the reaction chamber is opened again in order to allow the probe to enter the reaction chamber;

after opening the reaction chamber the probe is moved back from the sample preparation position $P_V$ to the previous measurement position $P_M$ or to a new initial position $P_A$ in the direct vicinity of the previous measurement position.

45. (New) The method as claimed in claim 44, wherein the relevant movement between the probe and the sample is carried out such that the previous measurement position $P_M$ and the new initial position $P_A$ are less than 600 nm apart from one another, preferably less than 200 nm apart from one another, and in particular less than 20 nm apart from one another.

46. (New) The method as claimed in claim 44, wherein the previous measurement position $P_M$ and the initial position $P_A$ are less than 0.04 parts per thousand, preferably less than 0.004 parts per thousand, in particular less than 0.0004 parts per thousand of the movement distance S, in which case the approximately constant increase in the distance for further treatment steps preferably increases by less than about 0.0035 parts per thousand, preferably less than 0.00035 parts per thousand, in particular less than 0.000035 parts per thousand of the movement distance S per treatment step.

47. (New) The method as claimed in claim 44, wherein a plasma is ignited and operated in the volume of the reaction chamber or in an adjacent chamber with a comparably large volume, in particular in a volume of 1 $cm^3$ to 10 $cm^3$.

48. (New) The method as claimed in claim 44, wherein the method steps are carried out automatically with the aid of computer control.